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AUTHOR Levy, Michal; Strube, Michael J.
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ABSTRACT

The recently proposed self-appraisal model of Type A behavior holds that Type As desire an accurate appraisal of abilities, and respond to uncertainty about abilities with exaggerated attempts to generate diagnostic information. The model also predicts that the major emotional response to uncertainty for Type As is anxiety. A study was conducted in which 80 college students classified as either Type As or Type Bs were induced to succeed or fail on a task where they were either very certain or very uncertain of their subsequent ability levels. Subjects completed questionnaires, performed anagram problems, received performance feedback indicating either success or failure, and completed other questionnaires measuring mood and performance attributions. The results indicated that task failure, compared to success, produced greater depression, anger, and frustration for all subjects. Consistent with the self-appraisal model prediction, uncertainty (regardless of success or failure) led to increased anxiety for Type As, but not for Type Bs. In fact, increased uncertainty produced lower anxiety for Type Bs, suggesting that Type As and Type Bs differ dramatically in their emotional responses to uncertainty about abilities. (Author/NB)

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Michal Levy and Michael J Strube

Running head: TYPE A AND UNCERTAINTY

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Address correspondence to Michael J Strube, Dept. of Psychology, Washington University, St. Louis, MO 63130.

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Abstract

The recently proposed self-appraisal model of Type A behavior holds that Type As desire an accurate appraisal of abilities, and respond to uncertainty about abilities with exaggerated attempts to generate diagnostic information. The model also predicts that the major emotional response to uncertainty for Type As is anxiety. In this study, Type As and Bs were induced to succeed or fail on a task where they were either very certain or very uncertain of their subsequent ability levels. Task failure produced greater depression, anger, and frustration for all subjects. Consistent with the self-appraisal model's prediction, uncertainty (regardless of success or failure) led to increased anxiety for Type As, but not Type Bs. In fact, increased uncertainty produced lower anxiety for Type Bs, indicating that Type As and Bs differ dramatically in their emotional responses to uncertainty about abilities.

Type A Behavior Pattern and Emotional Responses to Uncertainty: A Test of the Self-Appraisal Model

The Type A pattern represents a constellation of behavioral characteristics that has been implicated as a risk factor for the development of coronary heart disease (see Matthews & Haynes, 1986; Review Panel, 1981). The demonstrated health risks associated with the possession of the competitive, time-urgent, and aggressive Type A lifestyle have led to intense efforts to understand the underlying psychological dynamics (for reviews, see Dembroski et al., 1978; Glass, 1977; Krantz, Glass, Schaeffer & Davia, 1982; Matthews, 1982). These efforts are underscored by research indicating that the Type A and B patterns have implications for a wide range of social and psychological phenomena (see Strube, in press). Consequently, research efforts have produced several theoretical frameworks that each attempt to organize and explain the diverse findings obtained in this area. Recently, Strube (in press; see also Strube & Boland, 1986; Strube, Boland, Manfredo, & Al-Falaij, in press) has proposed a self-appraisal model that attempts to provide a cohesive framework for integrating other theoretical perspectives and their research findings. The purpose of this study is to test one key aspect of the self-appraisal model. Because the self-appraisal model is a relatively recent addition to the Type A literature, it is useful to develop some theoretical context before providing a description

of the model and the predictions to be tested in this study. Accordingly, we begin with a brief description of the three major theoretical models that have guided past research.[1] This review is intended to merely acquaint the reader with the basic theoretical models that have guided research in this area. More exhaustive analysis can be found in Matthews (1982), and Strube (in press).

The Uncontrollability View

According to the uncontrollability view (Glass, 1977), the hard-driving, competitive, time-urgent behaviors exhibited by Type As are intended to facilitate maintaining or regaining control over stressful aspects of the environment. There is substantial evidence in support of this view. Compared to Type Bs, Type As report a greater desire for control (Burger, 1985; Dembroski, MacDougall, & Musante, 1984), and are more reluctant to give up control to others even when such relinquishment is the most rational strategy (Miller, Lack, & Asroff, 1985; Strube, Berry, & Moergen, 1985; Strube & Werner, 1985). Furthermore, following initial exposure to salient uncontrollable stimuli, Type As exhibit more exaggerated responding than do Type Bs (termed "hyperresponsiveness", see Glass, 1977; Matthews, 1979). By contrast, following extensive exposure to uncontrollability, Type As exhibit more passive responding relative to Type Bs (termed "hyporesponsiveness"). This pattern of response duplicates that

predicted from the integration of reactance theory and the learned helplessness model (see Wortman & Brehm, 1977), both of which are control-based formulations (see Strube, in press). Taken together, past research is clear in identifying control as an important variable in the instigation of Type A behavior.

The Self Involvement View

Scherwitz and his colleagues (Sherwitz, Berton, & Leventhal, 1978; Scherwitz, Leventhal, et al., 1978; Scherwitz et al., 1983) have found that Type As exhibit higher self-referencing during the Structured Interview (operationalized as the number of personal pronouns: I, me, mine, etc.) than do Type Bs, and that Type As who exhibit high self-referencing also exhibit the highest physiological indications of stress during a series of experimental tasks. These researchers suggest that self-referencing reflects a greater tendency to focus attention on the self (see Carver and Scheier, 1981) and that when Type As compare their current performance to their internal standards, a large discrepancy is uncovered because those standards are high. Consequently, the Type A's behavioral style is interpreted as attempts to reduce the discrepancy between their current performance and their internal standards via a self-regulatory process such as that elaborated by Carver and Scheier (1981).

Although Type As do appear to self-reference more than Type Bs (Scherwitz et al., 1978), this represents only indirect

evidence that Type As are chronically more self-focused than Type Bs. There is little evidence that use of personal pronouns is a valid indicator of chronic self-involvement. However, although Type As may not engage in chronic self-focused attention, a self-evaluation process may be important in motivating Type A behavior. For example, it may be that Type As and Bs respond to certain situations with self-evaluative styles that foster different behavioral tendencies. As will become evident, this proposition plays a central role in the self-appraisal model.

The Developmental View

Matthews (1982, Matthews & Siegel, 1982) has proposed a developmental model that complements the previous two by attempting to outline the developmental sequence that produces Type A behavior. She (1982; Matthews & Siegel, 1982) has proposed that Type A behavior develops from a strong productivity value in combination with ambiguous standards of evaluation from parents. The developing Type A is encouraged to succeed but is not provided with consistent feedback through which to assess progress. The result is a child who continuously strives to achieve high but ill-defined goals. Support for this view comes from observations of child-parent interactions where mothers were found to actively encourage their Type A children to achieve but provided them less constructive and consistent feedback than did mothers of Type B children (Matthews, Glass, & Richins, 1977; see also Matthews,

1977). The developmental view advanced by Matthews has yet to receive much direct empirical attention. It does, however, serve to identify important variables that may promote the development of Type A behavior and is consistent with much related research (see Strube, in press).

Each of the theoretical views emphasizes a somewhat different aspect of Type A behavior that is critical to a complete understanding of the pattern. They provide a picture of the Type A as an individual who strives to control or master the environment, is sensitive to information about abilities, and whose concern for achievement and its evaluation appear to develop early in life. However, these views do not provide an overall cohesive model of Type A behavior. The self-appraisal model attempts to integrate these views.

A Self Appraisal Model of the Type A Behavior Pattern

The basic premise of the self-appraisal model is that Type As are more concerned than are Type Bs about gaining an accurate appraisal of their abilities, and thus respond to uncertainty about their abilities with greater attempts to generate diagnostic information (Strube, in press). Type A behaviors are considered manifestations of this self-appraisal motive. Like other views of Type A behavior, this model holds that the Type A and B patterns are reasonably stable individual differences that are subject to interaction with situational variables. Type A behavior is likely

to be elicited (in susceptible individuals) in some situations more than others; this model diverges from others in its assumptions regarding the key eliciting aspects of the situation. The model is depicted graphically in Figure 1.

Insert Figure 1 about here

The model asserts that the higher desire for accurate appraisal of abilities characteristic of Type As arises from childhood experience with high expectations coupled with ambiguous evaluative standards. The developmental sequence proposed by Matthews suggests that Type As are subjected to considerable uncertainty about their abilities, and experience considerable pressure to resolve that uncertainty in order to ascertain when goals have been achieved. Accordingly, the self-appraisal model views the achievement-oriented, hard-driving, and competitive Type A behaviors as representing attempts to generate the information necessary for a clear appraisal of abilities.

The model further asserts that situational factors that increase uncertainty combine with the Type As' desire for accurate appraisal to produce behavioral, emotional, cognitive, and physiological outcomes. The situational factors that produce uncertainty include a lack of control, violation of expectations, lack of feedback, inconsistent feedback, and nondiagnostic

feedback. As situational uncertainty increases, the desire for accurate appraisal by Type As should be more likely to produce behaviors intended to generate diagnostic information.

According to the self-appraisal model, uncontrollability is one of several factors that creates high uncertainty about one's abilities. The hyperresponsiveness typically exhibited by Type As following initial uncontrollability can be construed as an attempt to generate information necessary to "test" the hypothesis that the requisite abilities are not present (cf. Trope, 1982). The self-appraisal model is also consistent with the more passive responding exhibited by Type As following extensive uncontrollability. Rather than an expression of learned helplessness, the self-appraisal model views hyporesponsiveness as a suspension of hypothesis testing in the face of considerable evidence that the requisite abilities are not present.

Strube (in press) provides an extensive description of the model and its relation to past research. Of more interest here are studies designed specifically to test key aspects of the model. The central premise of the self-appraisal model is that when confronted with uncertainty about abilities, Type As will take more active steps than will Type Bs to resolve that uncertainty. This hypothesis was tested directly in a recent study by Strube, et al. (in press, Study 1). Subjects participated in two tasks that supposedly measured two different

cognitive abilities. All subjects were provided feedback indicating a moderate average ability level but the feedback varied in the degree of uncertainty concerning that average. Some subjects received feedback indicating either high or low certainty about both abilities, whereas for other subjects there was an asymmetry in the amount of uncertainty regarding ability level (high uncertainty about one ability, low uncertainty about the other ability). In the second phase of the study the subjects were allowed to construct a new test composed of items from the two ability domains previously assessed. Results indicated that when the previously received feedback was asymmetrical, more Type As (70%) than Type Bs (35%) constructed tests that were biased toward assessment of the domain having the greatest uncertainty. In fact, Type Bs appeared to bias their tests to assess cognitive domains about which they were more, not less, certain. When there was no asymmetry in the feedback, Type As and Bs did not differ in their domain preferences. Thus in a direct test of the self-appraisal motivation hypothesis, results confirmed the predicted tendency for Type As to attempt to resolve a salient uncertainty.

In a second study, uncertainty was resolved in a different fashion (Strube & Boland, 1986). Subjects first rated a test (anagrams) with regard to its diagnosticity, and then performed as many trials of the test as they wished. In actuality, subjects were given either easy or difficult anagrams. It was expected

that persistence on the task would be negatively related to perceived diagnosticity for Type As, particularly for the difficult anagrams. The negative relation between persistence and diagnosticity stems from the fact that when a task is low in its informativeness per unit of effort, it must be persisted at longer to provide an amount of information comparable to a more diagnostic test (cf. Trope, 1982). Failure induced by the difficult anagrams should create high uncertainty and elicit clear differences in self-appraisal between Type As and Bs (cf. Gastorf & Teevan, 1980). The predicted inverse relation was obtained only for Type As working on difficult anagrams, and somewhat surprisingly, a strong positive diagnosticity-persistence relation was found for Type Bs working on difficult anagrams. This latter finding suggests that Type Bs work hard to obtain redundant information, rather than attempting to resolve uncertainty.

In a third study, Strube et al. (in press, Study 2) attempted to explicitly test the self-appraisal model's explanation for the "learned helplessness" results often obtained with Type As. The self-appraisal model argues that the passive responding exhibited by Type As after extensive exposure to uncontrollable failure is a rational suspension of hypothesis testing when there is clear information that a requisite ability is not present. To test the hypothesis, subjects were initially induced to fail repeatedly on a task. Then, all subjects attempted to solve moderately

difficult anagrams. Half of the subjects were told that the anagrams measured the same ability as the initial task and the other half were told that the anagrams measured a different ability. According to the self-appraisal model, Type As should exhibit poor performance on the second task if it will not yield new information about their abilities. Consistent with this hypothesis, Type As performed most poorly when the second task replicated the first, but performed best when the second task allowed appraisal of a new ability. Type Bs exhibited intermediate performance that was uninfluenced by the diagnostic connection between tasks.

Overall, these studies support the basic premise of the self-appraisal model. Compared to Type Bs, Type As seek to resolve a salient uncertainty when one is evident, persist longer at a task that is perceived to be low in diagnosticity when uncertainty is high, and exhibit less effort when that effort will not yield new information. Thus, the self-appraisal model appears to provide a valid account of behavioral differences between Type As and Bs.

The intent of the present study was to test a somewhat different aspect of the self-appraisal model. In particular, the model proposes that the primary emotional response to uncertainty among Type As is anxiety. Anxiety is characterized by subjective feelings of tension, apprehension, nervousness and worry, and is accompanied by a heightened state of autonomic nervous system

activity (Spielberger, 1972, 1979). This affective response has been found to be elicited in response to situations that are perceived to be personally threatening, where there is uncertainty about the probability of an aversive outcome (for a review, see Garber, Miller, & Abramson, 1980), or where there is uncertainty about one's capacity to carry out competent future actions (Lazarus, 1966; Lazarus & Averill, 1972; Lazarus, Averill, & Opton, 1970; Lazarus & Opton, 1966; Schulz & Schonpflug, 1982). Strube (in press) argues that uncertainty about abilities should also produce anxiety. Indeed, one could argue that uncertainty about abilities underlies uncertainty about the probability of an aversive outcome and uncertainty about one's capacity to carry out competent future actions. Thus, given the Type As' greater concern about accurate appraisal of abilities, Type As should experience more anxiety than Type Bs when uncertain of their abilities.

This hypothesis takes on greater meaning when placed in the context of other possible emotional responses, particularly depression. Depression can be distinguished from anxiety in that depression occurs in response to an aversive outcome, regardless of the diagnostic implications (Garber et al., 1980). Thus, both Type As and Bs should feel more depressed following failure than following success, but only Type As should experience increased anxiety in the presence of uncertainty.[3] This distinction

provides a crucial test of the self-appraisal model. Unfortunately, research that only exposes individuals to success-failure manipulations may confound failure and uncertainty because failure often creates doubts about one's abilities. What is necessary is the independent manipulation of success-failure and uncertainty. In the present study, two levels of task diagnosticity were created independently of task difficulty so that emotional responses could be measured as a function of uncertainty separate from success and failure. It was predicted that all subjects (both Type As and Bs) would report more depression following failure than following success. Type As, however, were expected to report greater anxiety than Type Bs following performance low in diagnosticity, regardless of success or failure. It was also expected that Type As would experience more anxiety than Type Bs following failure because failure should produce more uncertainty for Type As due to their success orientation (see Gastorf & Teevan, 1980; Strube, in press; Strube & Boland, 1986).

Method

Overview

Subjects participated individually in what they were told was a study of the relationship between personality and cognitive flexibility. Cognitive flexibility was described as a correlate of creativity, and an ability that is highly desirable for those

wishing to succeed academically and in everyday functioning. These instructions were intended to heighten the involvement of the subjects. Subjects filled out questionnaires that they believed measured various personality variables, and then performed anagram problems that were purported to measure cognitive flexibility. Subjects were randomly administered tasks of either high or low diagnosticity, and either high or low difficulty. Following performance feedback indicating either success or failure, the subjects completed a questionnaire measuring mood and performance attributions.

Subjects

Eighty undergraduate volunteers (40 males and 40 females) participated in the study in exchange for $4.00. The mean age of subjects was 22 years. Prior to the experiment proper, all subjects completed the Jenkins Activity Survey (JAS), Form T (Kranz, Glass & Snyder, 1974), a student adapted measure of the Type A behavior pattern. This measure was scored at the conclusion of the study to insure that the experimenter remained blind to subjects' Type A-B status. Subjects were classified as Type As (scores of 8 or greater) or Type Bs (scores of 7 or less) based on a median split of scores on the JAS (*Md* = 8.58). It is important to note that one of the more vexing problems in the Type A literature is the less than adequate agreement in classification of different measures of Type A behavior, most notably the JAS and

the Structured Interview (SI, see Matthews, 1982; Matthews, Krantz, Dembroski, & MacDougall, 1982). Although both have been found to be predictive of coronary disease (Brand, 1978; Matthews & Haynes, 1986; Zyzanski, 1976), the SI bears a stronger relation in this regard and each measure appears to tap somewhat nonoverlapping aspects of the pattern (in addition to commonly measured features). Our choice of the JAS was governed by empirical evidence indicating that this questionnaire appears to tap primarily cognitive-perceptual factors that are more related to psychological processes than the physiological reactivity primarily assessed by the SI (for more extensive discussions, see Matthews, 1982; Strube, in press). It now appears that the JAS assesses a more global behavioral style and that only a small proportion of these identified as Type As by the JAS are truly coronary-prone (cf. Friedman, Hall, & Harris, 1985; Price, 1982). This does not lessen the utility of the JAS if, as is the case with self-appraisal model, one is interested in the broader psychological implications of Type A behavior. Furthermore, Strube (in press; Strube et al., in press) argues that the JAS is a more appropriate measure for testing the self-appraisal model because it directly assesses the behavioral preferences thought to reflect self-appraisal (i.e., competitiveness, drive, etc.). It is important to bear in mind, however, that results attained with the JAS may not generalize to samples test with the SI.

Procedure

Subjects participated in a study described as examining the relationship of cognitive flexibility to attitudes, beliefs and personality variables. Subjects were randomly assigned to one cell of a 2 x 2 (Success/Failure x High or Low Task Diagnosticity) factorial design. After completing the JAS, the subjects were told that cognitive flexibility relied on the individual's ability to manipulate unfamiliar stimuli into meaningful and recognizable stimuli. They were also told that this ability discriminated between those individuals who have the potential for creative, original thought, and those who do not. Following this explanation, the anagram task was introduced and the subjects were asked to read a brief historical description about the test (designed to increase the test's credibility).

Manipulation of Diagnosticity

After reading the test description, the subjects were shown one of two graphs that were meant to represent the normative distributions of scores of previous subjects. Subjects in the low diagnosticity (LD) condition were presented with a graph in which there was a large overlap in score distributions of those students high in cognitive flexibility and those students low in this ability. Therefore, for a large range of scores, the test would not discriminate very well between students that were high in cognitive flexibility and those low in cognitive flexibility

(unless the score in question was either very high or very low). On the other hand, the subjects in the high diagnosticity (HD) condition were shown a graph with very little overlap between high ability and low ability groups. In this case, the test was a good discriminator of the subjects' level of cognitive flexibility (cf. Trope & Ben-Yair, 1982).

All subjects were then given a brief pretask questionnaire as a manipulation check. This questionnaire was composed of four questions, each with a 7-point rating scale. The questions dealt with the importance of good performance for the subject, the subjects' performance expectations, how certain the subject was that he or she would perform as predicted, and the subjects' perception of the diagnosticity of the task. Then each subject received five sets of eight anagrams. The subject was given a total of four minutes to complete each set. After each set, the experimenter gave the subject accurate feedback; telling the subject the number correct and the amount of time it took them to solve the problems. Time was included in the feedback to increase the ambiguity of the scoring process, thereby reducing suspicion. After the five sets of anagrams were completed, the experimenter adjourned to her desk and appeared to use a complex scoring system which included time and number correct. These parameters were converted to a relative rating score.

Manipulation of Success and Failure

Subjects in the success condition received five sets of easy anagrams (see Strube & Boland, 1986), which served to induce the feeling of success that occurs when a task is accomplished quickly and easily. Because of the possible variability of performance, all subjects in the success condition received a relative rating score of 78, and were told that their scores were better than or equal to 78 percent of the people taking the test previously. In the LD condition, this score fell in the overlap between high and low ability groups, so that subjects were uncertain of their true ability. In the HD condition, this score fell clearly in the high ability group. Therefore, only those subjects in the HD-success condition received clear information that they were high in cognitive flexibility.

Subjects in the failure condition received five sets of very difficult anagrams (see Strube & Boland, 1986), which served to induce the experience of failure and frustration. All subjects in the failure condition received a relative rating score of 58 percent, and were told that 42 percent of the people taking the test before them scored better than they did. Again, in the LD-failure group this score fell in the overlap between high and low ability groups, leaving these subjects uncertain of their ability. In the HD-failure condition, this score fell clearly in the low ability group. Therefore, only these subjects received

clear information that they were low in cognitive flexibility.

Dependent Measures

After receiving feedback, subjects completed a post-performance questionnaire. The questionnaire included five 7-point mood rating scales that allowed a test of the major hypotheses. The five scales were each designed to assess one major affective response that could be expected in this performance setting: anxiety, nervousness, frustration, anger, and depression. Single item rating scales were used to assess mood because the effects of the manipulations were expected to be transitory. A lengthy questionnaire would not provide a fair test of the affective specificity inherent in the hypothesis if the subjects' mood changed over the assessment period. One consequence of this procedure is that the hypothesis is tested conservatively due to the lower reliability of single-item scales. In addition, although major interest was in the distinction between anxiety and depression, we included frustration, anger, and nervousness to allow a finer degree of specificity in affective reactions to the manipulations. This finer specificity offsets to some degree the low power inherent in using single item scales.

Both a 7-point perceived success rating scale and a performance satisfaction rating scale were also included to allow a check on the success/failure manipulation. Finally, we included

several scales to assess performance attributions. Four of these attribution scales measured dimensional perceptions. Subjects were asked to write down what they thought was the major cause for their performance. Then, subjects rated that cause along four dimensions: internal-external, stable-unstable, global-specific, and controllable-uncontrollable (cf. Peterson et al., 1982). Five additional 7-point scales required subjects to indicate the degree to which their performance was due to ability, effort, task difficulty, luck, and the degree to which they were responsible for their performance.

After the completion of the questionnaires subjects were probed for any suspicions. All subjects were unaware of the true purpose of the experiment, and only several harbored suspicions about the feedback manipulations. After probing subjects for possible suspicions, subjects were debriefed, paid $4.00, and excused.

Results

All analyses reported below represent 2 x 2 x 2 (Type A/B x Success/Failure x High/Low Uncertainty) analyses of variance (ANOVA). Preliminary analyses indicated an absence of sex differences. Consequently, results are collapsed across sex of subject.

Manipulation Checks

An ANOVA performed on the number of anagrams solved was

highly significant, $F(1,66) = 213.45$, $p < .001$, with subjects scoring predictably higher in the success confition ($M = 32.92$) than in the failure condition ($M = 10.24$). Analyses also indicated that the uncertainty (diagnosticity) manipulation was reliable, $F(1,66) = 3.80$, $p = .055$, with a mean perceived diagnosticity rating (7-point scale) for the high diagnosticity condition ($M = 4.93$) exceeding the rating for the low diagnosticity condition ($M = 4.30$). Note that the weaker nature of this manipulation is more apparent than real. Subjects completed the diagnosticity rating prior to receiving feedback; the nature of the feedback served to reinforce the diagnostic nature of the task (recall that the relative rating score was located either inside or outside the distribution overlap). As subsequent analyses will show, the diagnosticity manipulation was quite robust.

Additional analyses demonstrated a significant effect of success and failure on both the performance rating ($F(1,66) = 53.57$, $p < .001$), and on the rating of satisfaction with performance ($F(1,66) = 33.32$, $p < .001$). The findings indicated that subjects perceived their performance as being of higher quality when they succeeded ($M = 4.82$) than when they failed ($M = 2.68$). Similarly, subjects rated themselves as more satisfied with good performance ($M = 4.73$) than with poor performance ($M = 2.73$).

Mood as Mediated by Type A/B and Uncertainty

Overall, the interactive effect of Type A/B and the uncertainty manipulation on mood was significant only for anxiety, $F(1,66) = 7.56$, $p < .01$. The analyses did not yield significant mood effects for depression, $F(1,66) = 1.62$, frustration, $F(1,66) = 1.64$, anger, $F(1,66) = .17$, or nervousness, $F(1,66) = 2.50$. As Figure 2 illustrates, the mean rated anxiety level for Type As in the high uncertainty condition was significantly higher than that reported by Type Bs, $t(66) = 2.72$, $p < .01$. Interestingly, in the low uncertainty condition, the opposite pattern emerged; Type Bs responded with greater anxiety than did Type As although the difference was not reliable, $t(66) = 1.77$. Note, however, that Type Bs reported significantly more anxiety under low uncertainty than under high uncertainty, $t(66) = 2.44$, $p < .025$. These findings indicate that, as predicted, the only mood dimension significantly affected by both uncertainty and by Type A/B status, independent of success and failure, is anxiety.

Insert Figure 2 about here

Independent Effects of Success and Failure

The effects of success and failure, independent of diagnosticity, yielded several significant findings. First, success and failure were found to significantly influence reported

levels of depression, $F(1,66) = 5.94$, $p < .025$, ($M = 2.16$ for success, $M = 3.01$ for failure), frustration, $F(1,66) = 22.66$, $p < .001$ ($M = 2.54$ for success, $M = 4.53$ for failure) and anger, $F(1,66) = 5.93$, $p < .025$, ($M = 1.72$ for success, $M = 2.60$ for failure). It is important to note that success and failure did not significantly influence anxiety, $F(1,66) = 1.66$.

These results, when considered along with those indicating a Type A-B by uncertainty interaction for anxiety, provide strong support for the self-appraisal model's predictions. All subjects were more depressed following failure, but only Type As were more anxious following a performance low in diagnosticity (regardless of the quality of that performance). These findings implicate anxiety as a distinguishing emotional response to uncertainty among Type As and Bs.

Also evident was a general self-serving bias. First, subjects tended to rate the level of effort expended on the task as significantly greater when they succeeded ($M = 5.14$) than when they failed ($M = 4.31$), $F(1,66) = 9.37$, $p < .01$. Second, there was a significant tendency to report that the level of difficulty on the task helped their performance when they succeeded ($M = 4.79$) and hurt their performance when they failed ($M = 3.08$), $F(1,66) = 38.52$, $p < .001$. Finally, subjects reported that they felt significantly more responsible for their performance on the task when they succeeded ($M = 5.90$) than when they failed ($M =$

4.91), $F(1,66) = 10.65$, $p < .01$. In sum, subjects in the failure condition reported that they had expended less effort for poor performance, that this performance was adversely affected by the difficulty of the task, and that they were less responsible for their performance when they failed.

Mood as Mediated by Type A/B and Task Difficulty

Results also indicated that mood was influenced by the combination of Type A/B and success versus failure in a way consistent with predictions. Because failure generally induces more uncertainty about one's abilities than does success, Type As should become more anxious when they fail than when they succeed, compared to Type Bs. This interaction approached significance, $F(1,66) = 3.82$, $p < .055$. Type As were more anxious when they failed ($M = 3.69$) than when they succeeded ($M = 2.46$), while Type Bs showed similar anxiety ratings for success ($M = 2.79$) and failure ($M = 2.53$).

Discussion

Taken together, the results provide firm support for the emotional component of the self-appraisal model. Three results in particular are crucial to this conclusion. First, and most critical, it was found that independent of success or failure, Type As responded to uncertainty about their abilities with greater reported anxiety than did Type Bs. Second, anxiety was the only emotional response that was influenced jointly by Type A-

B and uncertainty. Finally, success and failure did influence depression, anger, and frustration, but not anxiety. This latter effect is important because it rules out an explanation of the current results based on insensitive measurement of emotional responses other than anxiety. Also supportive of the uncertainty-anxiety link for Type As was the finding that Type As, but not Type Bs, reported more anxiety following failure than following success.

It is useful to consider the present findings in the context of previous discussion of the distinction between anxiety and depression. Garber, Miller, and Abramson (1980) argue that both anxiety and depression are responses to uncontrollability. They emphasize that uncontrollability combines both an element of uncertainty about an outcome, and a sense of hopelessness if that outcome has a significant chance of being negative. The depression associated with uncontrollability is theoretically a response to hopelessness, while anxiety is a response to uncertainty. Thus in failure situations, when an individual perceives continued attempts at a task as hopeless, depression is a likely outcome. This finding was supported in the present study. Both Type As and Bs became significantly more depressed in the failure condition, and this finding was independent of uncertainty. Thus, Type As were not more likely than Type Bs to feel depressed when a situation seemed hopeless. However, though

Type As were not more depressed than Bs when they failed, they were more anxious. Therefore, corresponding to Garber and Seligman's argument, and consistent with the self-appraisal model, Type As were responding to the added uncertainty that failure provokes, and not the hopelessness of their attempts at achieving success.

These results have important theoretical implications. One common finding reported in support of the uncontrollability view of Type A behavior is that Type As respond to extensive exposure to uncontrollability with hyporesponsiveness, a finding interpreted as greater learned helplessness. This view would appear to predict that failure should lead to greater depression among Type As than Type Bs, if it is the controllability aspect of failure to which they are most sensitive. The self-appraisal model argues instead that it is the uncertainty created by failure that is important to Type As, and that the emotional consequence is greater anxiety. The present results are thus more consistent with the self-appraisal view. It is useful to note that other research also casts doubt on the likelihood that Type As are "helplessness-prone." As noted earlier, Strube et al. (in press) have produced results that mimic the helplessness findings but that are entirely interpretable within the framework of the self-appraisal model. Furthermore, Type As have not been found to exhibit a helplessness-prone attribution style (Strube, 1985;

Strube & Boland, 1986). Thus it does not seem warranted to characterize Type As as being more susceptible to learned helplessness. Rather, the different reactions of Type As and Bs to uncontrollability are best considered as stemming from different responses to uncertainty.

The discussion thus far has emphasized the responses of Type As. Yet, the responses of Type Bs in this study also deserve consideration. Type Bs responded to uncertainty in a manner opposite to that exhibited by Type As. Taken by itself, this result could be attributable to chance. However, past tests of the self-appraisal model have also uncovered this pattern (Strube & Boland, 1986; Strube, et al., in press, Studies 1 and 3). That is, past research indicates that Type Bs respond to uncertainty with attempts to generate redundant information, rather than resolving uncertainty, apparently indicating more comfort on the part of Type Bs with a lack of certainty. The present study provides direct support for this conclusion by indicating less anxiety by Type Bs when the task was low in diagnosticity. Taken together, these findings indicate that it is inappropriate to consider Type Bs as harboring a less intense self-appraisal motivation than Type As. Rather, Type Bs appear to possess a qualitatively distinct motivational dynamic that deserves additional study. One problem with current conceptualizations of Type A and B behavior is that the emphasis has been placed on

explaining the behavior of Type As, and little attention has been given to the unique characteristics of Type Bs. This would appear to be a critical problem for future research.

The utility of the self-appraisal model's emotional component is that it provides a marker for identifying the causes of stress among Type As and Bs. For example, if a sample of Type As and Bs both exhibited a high degree of depression, then it might be prudent to look for situational factors producing negative outcomes. If, on the other hand, Type As and Bs diverged in their reported anxiety, the self-appraisal model would argue that attention should be directed toward situational factors that promote high or low uncertainty. This degree of specificity underscores the importance of considering stress a multidimensional construct that may have different causes for different individuals.

In sum, the self-appraisal model predicts behavioral, emotional, cognitive, and physiological responses to uncertainty. So far, there has been strong support that Type As respond to uncertainty with behaviors that are directly instrumental in reducing uncertainty (Strube, in press; Strube, et al., in press; Strube & Boland, 1986;) whereas Type Bs do not. To date, there has only been indirect or post hoc evidence of differential emotional, cognitive and physiological responses to uncertainty for Type As and Bs. The results of the present study

directly support the model's predicted emotional difference for TypeAs and Bs under conditions of uncertainty. Furthermore, the results underscore the need for a more careful assessment of the motivational dynamics underlying Type B behavior.

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Footnotes

[1]A fourth model proposed by Price (1982) has yet to receive substantial empirical attention. Consequently, it will not be considered in detail here. Strube (in press) provides an evaluation of this model. Note also that although initial interest in Type A behavior grew out of its association with coronary disease, it has since become an important individual difference variable in relation to more general psychological phenomena. The self-appraisal model is intended to provide a general theoretical model for integrating these more psychological aspects of Type A behavior, and only secondarily is it intended as a model explaining enhanced coronary risk. The ultimate utility of the model should be judged with these intentions in mind.

[2]Researchers have examined the relation of Type A behavior to trait anxiety (e.g., Francis, 1981; Smith, Houston, & Zurawski, 1983; see also Matthews, 1982) with inconsistent findings obtained. These studies are not relevant to the present discussion in that the self-appraisal model proposes that heightened anxiety is a response elicited in Type As only in certain situations and not chronic in its display.

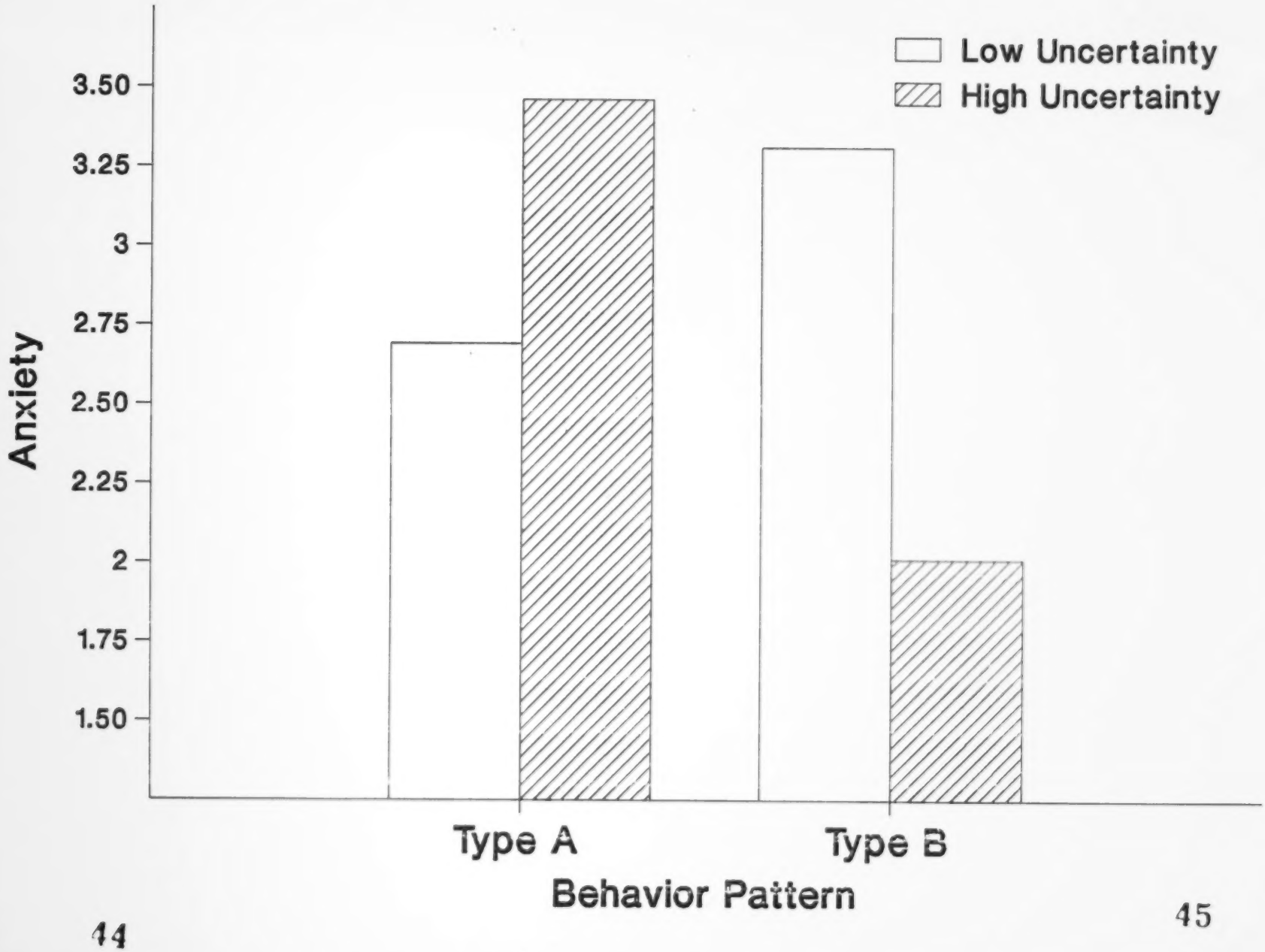
[3]Other researchers have attempted to delineate the dimensional structure of mood. For example, Watson and Tellegen (1985) have demonstrated that two basic independent dimensions appear to underlie mood. Depending on the positioning of the axes, these dimensions can be described as positive affect and

negative affect (see also Diener, 1984; Diener & Emmons, 1984; Diener, Larsen, Levine, & Emmons, 1985) or pleasantness and engagement (see also Russell, 1979, 1980, 1983; Russell & Bullock, 1985). What is important to note for present purposes is that anxiety and depression occupy different locations in affective space. Whereas depression is characterized by unpleasantness and moderate engagement, anxiety is characterized by strong engagement or activation and only moderate unpleasantness. The location of anxiety is consistent with the motivational dynamics proposed by the self-appraisal model in that Type As attempt to resolve uncertainty through active information-generating behaviors.

Figure Caption

Figure 1. A self-appraisal model of Type A behavior.

Figure 2. Anxiety as a function of Type A behavior and task diagnosticity.


Low Uncertainty
High Uncertainty
3.50
3.25
3
2.75
2.50
2.25
2
1.75
1.50
Anxiety
Type A
Type B
Behavior Pattern